AMENDMENTS TO THE SPECIFICATION

A.   In the specification please replace paragraph [0008] (the paragraph begins with "A camera or some other sensor..." and ends with "...centroid of the upper ellipse.") with the following paragraph:

[0008] A camera or some other sensor is used to capture an ambient image, the image of the occupant and the area surrounding the occupant. A segmented image, the image of the occupant with the surrounding area removed from the image, is obtained through a process called segmentation. The segmented image is then subjected to ~~an~~ a shape fitting process that fits an upper shape to the upper torso of the occupant. A lower shape is fitted from the occupant's hips down to the occupant's feet. The two shapes can overlap at one point, the centroid of the occupant, in the area of the occupant's hips. In the preferred embodiment, an ellipse is the shape used and the relevant centroid is the centroid of the upper ellipse.

B.   In the specification please replace paragraph [0014] (the paragraph begins with "Position, velocity, and acceleration..." and ends with "...high-speed video camera.") with the following paragraph:

[0014] Position, velocity, and acceleration are tracked and predicted for all motion variables. An occupant's motion is defined into one of several predefined "modes" such as "stationary," "human," or "crash". All processing by the motion tracker and predictor is modeled in each of the predefined modes. Predictions are generated for each mode. Using the probabilities associated with potential transitions from one mode to another mode, and incorporating past predictions ~~thought~~ through the use of an iterative and weighted Kalman filter, the motion tracker and predictor will generate one combined estimate for each motion variable. The motion tracker and predictor can be used to generate estimates more frequently than a camera can capture images. Thus, the system does not require the use of a high-speed video camera.

C.   In the specification please replace paragraph [0030] (the paragraph begins with "The segmented image..." and ends with "...the computer system at 30.") with the following paragraph:

[0030] The segmented image 42 of the occupant 18 is then subject to an ellipse fitting routine 44. An upper ellipse is fitted around the upper torso of the occupant 18. The upper torso includes everything from the occupant's 18 head down to the occupant's hips. A lower ellipse is fitted from the occupant's 18 toes up to the occupant's 18 hips. Both ellipses overlap at one point which can be referred to as the junction centroid 53, but the centroid 54 is preferably identified as the center of the upper ellipse 58. The output of the ellipse fitting routine 44 will be discussed in greater detail below along with the discussion relating to Figs. 4, 5, and 6. The process and practice of generating an upper ellipse, a lower ellipse, and a centroid to represent different parts of the occupant 18 is well known in the art. In the preferred embodiment of the invention, the ellipse fitting routine 44 is applied by the computer system 30, but in other embodiments, the ellipse fitting routine 44 could be performed by a separate computer from the computer system at 30.

C.   In the specification please replace paragraph [0035] (the paragraph begins with "Fig. 4 illustrates…" and ends with "…the upper ellipse 58.") with the following paragraph:

[0035] Fig. 4 illustrates the ellipse fitting routine 44 implemented by the computer system 30. The upper ellipse 58 extends from the hips up to the head of the occupant 18. The lower ellipse 56, 56 extends down from the hips to include the feet of the occupant 18. If the entire area from an occupant's 18 hips down to the occupant's 18 feet is not visible, a lower ellipse is generated to represent what is visible. Both ellipses overlap at a point that can be known as the junction centroid 53–54, although the centroid 54 is preferably the center of the upper ellipse 58. In non-preferred embodiments, shapes other than ellipses are used to represent the upper and lower parts of an occupant 18. The ellipse fitting routine is well known in the art. The image processing system need not utilize the lower ellipse 56, and it is preferable to generate the centroid 54 with respect to the upper ellipse 58.

D.   In the specification please replace paragraph [0036] (the paragraph begins with "Fig. 5 illustrates…" and ends with "…in greater detail below.") with the following paragraph:

3

[0036] Fig. 5 illustrates many of the characteristics that can be inputted into the computer system 30 from the ellipse fitting routine 44. Motion characteristics include the x-coordinate ("distance") 60 of the junction centroid 53–54 and the forward tilt angle ("θ") 62. Shape measurements include the y-coordinate ("height") 59–58 of the junction centroid 53–54, the length of the major axis of the ellipse ("major") 64 and the length of the minor axis of the ellipse ("minor") 66. Other shape measurements include the forward-most point 68 of the upper ellipse 58 (in the x-coordinate direction), which point 68 defines a vertical plane 70. Rate of change information, such as velocity and acceleration, are also captured for all shape and motion measurements, so in the preferred embodiment of the invention there are nine shape characteristics (height, height', height", major, major', major", minor, minor', and minor") and six motion characteristics (distance, distance', distance", θ, θ', and $\theta"$). The sideways tilt angle Φ is not shown because it is perpendicular to the image plane, and this the sideways title angle Φ is derived, not measured, as discussed in greater detail below.